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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/765,365	01/27/2004	Richard Robert Soelch	SFI-012	1570

21323 7590 12/28/2004

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EXAMINER

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ART UNIT PAPER NUMBER

3723

DATE MAILED: 12/28/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

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Office Action Summary	Application No. 10/765,365	Applicant(s) SOELCH ET AL.	
	Examiner George Nguyen	Art Unit 3723	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-29 is/are pending in the application.
- 4a) Of the above claim(s) 20-29 is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-19 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 27 January 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date ____. | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Claims 20-29 were withdrawn from further consideration due to a restriction as indicated below.

Claims 1-19 are presented for examination.

This application has been filed with formal drawings which are acceptable to the examiner.

Election/Restrictions

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:
 - I. Claims 1-19, drawn to an abrasive article, classified in class 451, subclass 538.
 - II. Claims 20-29, drawn to a method of making an abrasive article, classified in class 51, subclass 295.

The inventions are distinct, each from the other because of the following reasons:

2. Inventions I and II are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make other and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case the product can be made by compacting.
3. Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

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4. During a telephone conversation with Mr. Michael Brodowski on December 21, 2004 a provisional election was made without traverse to prosecute the invention of Group I, claims 1-19. Affirmation of this election must be made by applicant in replying to this Office action. Claims 20-29 were withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

5. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

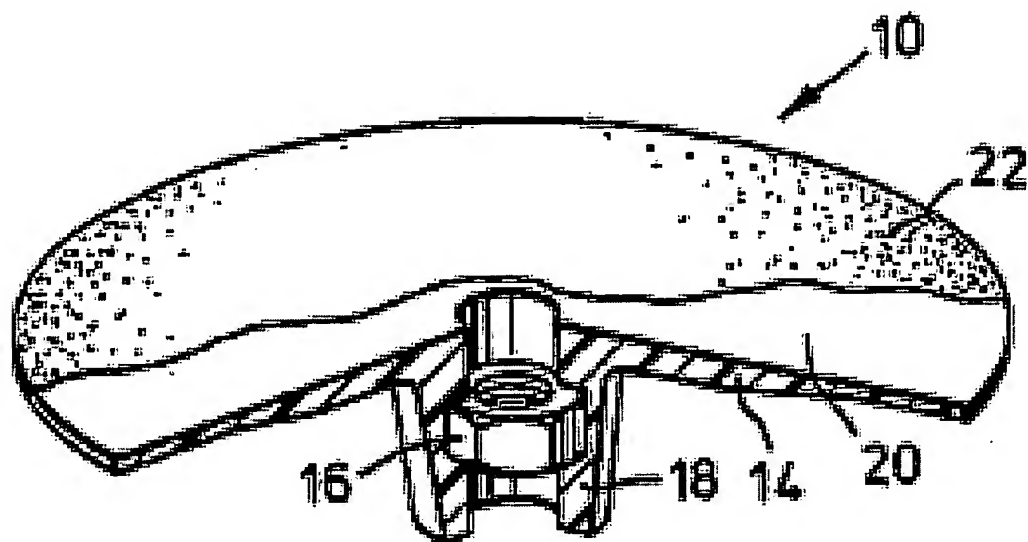
7. Claims 1, 2, 3, 5, 6, 7, 8, 9, 10 are rejected under 35 U.S.C. 102(b) as being anticipated by Grimes et al.'4,653,236.

With reference to Figure 2, col. 3-4, Grimes discloses the claimed invention including:

(a) a thermoplastic polymer layer 22. Please note that polymer and resin is the same thing.

(b) abrasive grit such as diamonds, alumina, etc..., (col. 4, lines 41-46), uniformly dispersed in layer 22.

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4,653,236

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plastics resin which contains abrasive grit and cured in the disk manufacturing process described herein;

FIG. 3 illustration of a self-supporting grinding disk according to the invention, partly broken away to show construction.

FIG. 4 is a schematic illustration of the manner of manufacturing a self-supporting grinding disk according to this invention;

FIG. 5 is an illustration of a parallel grinding operation with the self-supporting grinding disk of the invention.

FIG. 6 is an illustration of an edge grinding operation with a self-supporting disk of the invention.

Referring to the drawings, the numeral 10 generally refers to a finished self-supporting grinding disk according to this invention. It has been broken away to illustrate construction.

In use, the grinding disk is threaded onto the end of shaft 12 of a grinding machine 14. In this connection, a nut 16 is embedded in the hub portion 18 of the disk body 20 so that the shoulder on the shaft 12 is tightened against an end of the nut.

The disk body 20 is made from a thermal plastics material such as nylon and in the embodiment of the invention illustrated has a central hub portion 18 within which is embedded the nut 16 for the purpose of securing the disk to a shaft in use. It also has a flexible workpiece-contour-following portion outwardly of the hub portion. The grinding face is coated with a layer of thermosetting plastics resin 22 which contains abrasive grit. The disk body and the layer of thermosetting grit containing material are fused together to form a self-supporting grinding disk.

The manner of using the grinding disk is indicated in FIGS. 5 and 6. Firstly, the self-supporting grinding disk is screw threaded to the shaft 12 of a grinding machine 14. The shaft 12 is then mounted into the chuck of the rotational grinding machine which is of conventional design. In the example of FIG. 5, a wooden bowl is mounted in a mandrel that extends from the shaft of an electric motor 26. The wooden bowl is rotated as the motor is operated and the grinding tool 14 is operated to rotate the grinding disk 10 at a rate of about 15000 rpm. The grinding disk is moved over the surface of the bowl to achieve the desired smoothing.

The required mechanical characteristics of the disk body 20 of the self-supporting grinding disk include at least some of the mechanical characteristics of the rubber back-up pad of the prior art that is used to support the removable non-self-supporting coated abrasive disks of the prior art. More specifically, the resilient thermoplastics disk 20 must have resilience, but at the same time it must have strength to transmit the grinding force from the tool 14 as it is urged against the workpiece 24. It must be resilient to flex to the shape of the workpiece, but at the same time, it must have strength to transmit a grinding force when pressed against the workpiece at the temperatures encountered in parallel grinding.

The deflection temperature tests of American Society for Testing and Materials designated as D648-82 are satisfactory for determining deflection of the disk material. The method of these tests covers the determination of the temperature at which an arbitrary deformation occurs when specimens are subjected to an arbitrary set of testing conditions. A test bar of plastics material of rectangular cross section is tested as a simple beam with the load applied at its center to give maximum fiber stresses of 1820 kPa (264 psi). The specimen is immersed under load in a heat-transfer medium provided with a

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means of raising the temperature. The temperature of the medium is measured when the test bar has deflected 0.25 mm (0.010 in.). This temperature is recorded as the deflection temperature under flexural load of the test specimen. The materials satisfactory for the disk of this invention according to this test have a deflection temperature of between 125° F. and 350° F. for a flexural load of 264 psi on the test bar.

It is not unusual to reinforce plastics materials with fiberglass to increase their strength in deflection. Plastics materials so reinforced are not satisfactory for this invention. They will not disintegrate properly on edge grinding. A plastics disk with any significant amount of fiberglass in it as a reinforcement will have a deflection temperature according to the tests D648-82 of the American Society for Testing and Materials greater than 350° F. and is not within those materials satisfactory for this invention.

The thermal plastics material must also have a relatively high melting point to withstand the heat of the grinding friction encountered in substantially parallel grinding operation such as illustrated in FIG. 5. At the same time, it is part of the function of the disk to disintegrate under the kind of more intense temperatures encountered with an edge grinding operation as illustrated in FIG. 6. These things are discussed in further detail later in the specification.

A further important characteristic of the thermoplastics material of the disk 20 is its ability to become compatible with and fuse to the thermosetting plastic resin 22 that is used to bind the abrasive grit and form the grinding surface of the grinding disk as a unit.

As indicated, the abrasive grit is bonded to the disk body 20. The thermosetting resin is of good thermal and chemical resistance and curable at an appropriate temperature to achieve a hard tough thermal fused state with high strength at elevated temperatures encountered in parallel grinding. The curing characteristics of the resin 22 will be discussed later in this specification.

The abrasive grinding grit may be of any variety of natural or synthetic abrasive material such as diamonds, flint, emery, garnet, aluminum oxide, silicon carbide, alumina, zirconia, ceramic aluminum oxide as required for the job to be done in accordance with standard abrasive practice.

As just noted, the disk body 20 is moulded from a thermoplastics material that is chosen for its compatibility with the thermosetting plastics material 22 and which has the strength and other characteristics necessary to provide a self-supporting grinding disk capable of parallel grinding and also capable of edge grinding to achieve a smooth and continuous heat disintegration at the same rate as the plastic resin grit containing layer 22 is abraded away under conditions of edge grinding. Polyamide of the variety known as type 6 or type 6/6 work well. These types of polyamide nylon have an ideal co-efficient of linear thermal expansion of about 0.00009 inches per degree centigrade.

The thickness of the support disk 20 is important. If it is too thick, the grinding disk 10 will not smoothly and continuously heat disintegrate at the same rate as the plastic resin grit containing layer is abraded away. If it is too thin, it will not have sufficient strength to support the grit containing layer in parallel grinding operations. It has been found that a thickness of a suitable plastics material at the outer peripheral edge of a disk should be between five and fifty thousandths of an inch.

Claim Rejections - 35 USC § 103

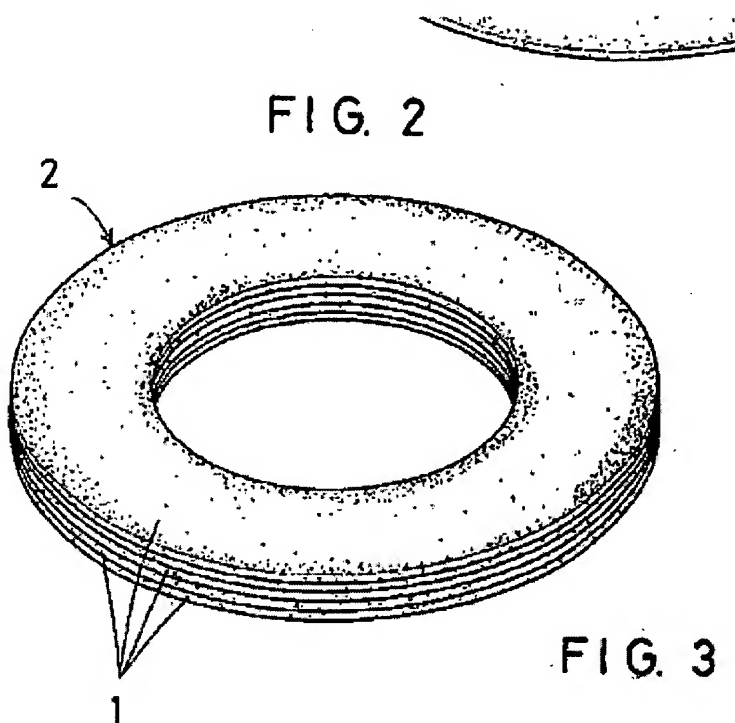
8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 4 and 11-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Grimes et al.'236 in view of Ichiguchi'875.

Grimes et al.'236 has been discussed above, but does not disclose a second layer adjacent the thermoplastic polymer layer.

With reference to Figure 2, col. 2, lines 17-21, Ichiguchi discloses an abrasive member 2 comprising a plurality of abrasive-coated cloth paper 1 bonded together. The advantage is when topmost abrasive sheet gets worn out, the sheet thereunder will be exposed. Thus, the abrasive member can maintain its abrading capacity for a long time and show a long service life.



When the topmost abrasive sheet forming the abrasive member gets worn out, the sheet thereunder will be exposed. Thus, the abrasive member can maintain its abrading capacity for a long time and show a long service life.

Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the abrasive article of Grimes with a teaching of bonding a plurality of abrasive sheet together as taught by Ichiguchi in order to expose the undersheet when the topmost sheet got worn out to maintain its abrading capacity for a long time.

Regarding to claim 11, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have utilized the range set forth in the claims since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art.

Regarding to claims 12-13 and 18-19, per MPEP

**MANNER OF OPERATING THE DEVICE DOES NOT DIFFERENTIATE
APPARATUS CLAIM FROM THE PRIOR ART**

A claim containing a "recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus" if the prior art apparatus teaches all the structural limitations of the claim. *Ex parte Masham*, 2 USPQ2d 1647 (Bd. Pat. App. & Inter. 1987) (The preamble of claim 1 recited that the apparatus was "for mixing flowing developer material" and the body of the claim recited "means for mixing ..., said mixing means being stationary and completely submerged in the developer material". The claim was rejected over a reference which taught all the structural limitations of the claim for the intended use of mixing flowing developer. However, the mixer was only partially submerged in the developer material. The Board held that the amount of submersion is immaterial to the structure of the mixer and thus the claim was properly rejected.).

Since the prior art article teaches all the structural limitations of the claims, the recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed article from a prior art.

Conclusion

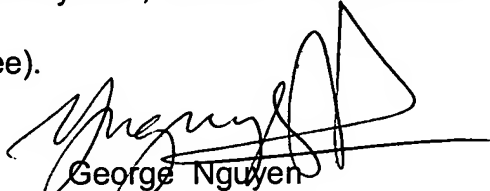
10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Morimura et al.'521, Mattesky'809, Laperre'775, and Davidson et al.'989 all disclose abrasive article with thermoplastic polymer sheet.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to George Nguyen whose telephone number is 703-308-0163. The examiner can normally be reached on Monday-Friday/630AM-300PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Joseph Hail can be reached on 703-308-2687. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

GEORGE NGUYEN
PRIMARY EXAMINER



George Nguyen
Primary Examiner
Art Unit 3723

GN – December 22, 2004